REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-6 are pending in the present application. New independent claim 6 has been added.

Claims 1-5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Baudu et al (herein "Baudu") in view of Johnson et al or Johnson.

Claim 1 is directed to turbojet thrust reverser. The thrust reverser includes two doors displaceable between an open position and a closed position of the reverser. Each door is controlled by a respective electronic control unit. The electronic control units are connected to each other in order to exchange the position data for the doors. The reverser further includes a FADEC having two channels each connected to both electronic control units in order to receive the position data from each of the doors from the electronic control units together with data concerning the operating state of each of the electronic units. The two channels of the FADEC are connected to each other so as to exchange door position data and electronic control unit state data so that the airplane pilot is continuously informed about the position of the doors and the states of the electronic units, even in the event of one of the electronic units breaking down and one of the FADEC channels breaking down.

In the non-limiting embodiment, the thrust reverser has two doors, 10a and 10b, each displaceable between and open position and closed position. The doors are moved by at least one actuator and Fig. 1 shows three actuators 12. The reverser also includes a motor for each door, 14a and14b. These motors drive the actuators 12 controlling each door 10a, 10b. Electric motors 14a, 14b are each mounted directly on an electronic control unit, 18a and 18b. The electric control units govern the entire sequence of moving the two doors. The electronic control units 18a, 18b may also exchange data between each other via an electrical link 30.

Such data exchange between the two electronic units facilitates comparison of data concerning the positions of the two doors. Each electronic control unit 18a, 18b is electrically connected to both of the two channels of the FADEC. The channels of the FADEC are capable of exchanging data between each other.

The thrust reverser includes a plurality of sensors. As shown in figure two, the sensors 40, 42, and 43 for each door 10a, 10b transmit door position data and state data concerning the primary and tertiary latches to the electronic control units 18a, 18b. Because the electronic control units 18a, 18b are interconnected by electrical link 30, each electronic control unit receives the data coming from both sets of sensors 40, 42, and 43. Each electronic control unit knows the sensor data for each door 10a, 10b.

Each electronic control unit 18a, 18b sends data concerning its own operating state and data from sensors 40, 42 and 43 over channels 20a, 20b of the FADEC. The channels of the FADEC can exchange data between each other. Each channel of the FADEC has the data for each set of sensors 40, 42 and 43 and each electronic control unit 18a, 18b. The FADEC then transmits the data it receives to the airplane cockpit.

By means of data crossing over this way, the thrust reverser of the invention enables the thrust reverser control system to be continuously informed about the positions of both doors of the reverser and the operating states of both electronic units. This continues to be the case under all breakdown configurations.

In the event of one the electronic units 18a, 18b failing, the non-operating state of the electronic unit is sent to the FADEC channels 20a, 20b, that is associated therewith. Since the electronic control units receive data from both doors, this data continues to be transmitted to the FADEC channel 20a, 20b associated with the remaining electronic unit.

If one of the FADEC channels 20a, 20b fails, the remaining FADEC channel will continue to receive data and transmit that data to the thrust reverser control system.

If both a FADEC channel and an electronic control unit breakdown, provision is advantageously made to connect each electronic control unit to both of the FADEC channels so that the remaining FADEC channel receives all of the data needed for transmission to the thrust reverser control system.

The applicants consider the above-mentioned characteristics of the present invention not to be routine steps that one skilled in the art would have made.

Turning now to the rejection of Claims 1-5 as being obvious over Baudu in view of Johnson et al or Johnson, Applicants respectfully submit that the limitations of Claims 1-5 are not obvious over Baudu in view of Johnson et al or Johnson.

Baudu discloses a thrust reverser for a turbojet having doors controlled by an electronic control unit where the electronic control unit is connected to the FADEC. However, Baudu fails to disclose that the thrust reverser includes at least two electronic control units which each control one door. Fig. 1 of Baudu discloses only one electronic control unit. The specification of Baudu refers to the electronic control unit in the singular. Col. 2 lines 18-19 refers to ". . . an electronic control unit . . ." Col. 4 line 27 and line 30 refer to "The electronic control unit . . ." Without more than one electronic control unit, the thrust reverser control system will not be informed of the door positions under all breakdown configurations.

Applicants respectfully acknowledge that the Examiner has indicated that Baudu does not disclose two channels in the FADEC. Applicants respectfully submit that claim 1 requires more than just the existence of two channels in the FADEC. Claim 1 requires a "...FADEC having two channels each connected to both electronic control units in order to receive the position data from each of the doors...," and that the two channels be "connected to each other so as to exchange said door position data...."

Johnson et al discloses a thrust reverser for a turbojet that includes two doors, each door being actuated by a motor. The motors are controlled individually by control channels which receive commands from a FADEC. Johnson et al does not disclose that the two control channels are connected to each other in order to exchange the position data of the door they control. Fig. 4 does not show two control channels connected in order to exchange position data. The only connection between the control channels shown in Fig. 4 is 212. 212 is a synchronization mechanism that supplies the driving force to the actuators 208. Col. 4 lines 37-39.

Johnson et al does not disclose that the two control channels are each connected to both channels of the FADEC in order to receive the position data from each of the door. Col. 4 lines 28-44 do not disclose each of the control channels being connected to the both channels of the FADEC. The above citation discloses only that the control channels receive commands from a FADEC.

Johnson et al does not disclose the two channels of the FADEC and subsequently fails to disclose that the two channels of the FADEC are connected to each other so as to exchange data. Fig. 4 does not illustrate an engine control system, such as a FADEC. Johnson et al only discloses that a FADEC sends commands to a first and second control channel. Col. 4 line 32-34.

Johnson discloses a turbojet thrust reverser that uses a plurality of actuators, each connected to a transcow and interconnected by one or more flexible shafts. Each actuator is controlled by a motor, which is controlled by a multi-channel control unit. The control unit receives signals from a FADEC.

Johnson does disclose that more than one control unit may be used. Johnson does not disclose that when more than one control unit is used, that the electronic control units be connected to each other in order to exchange position data. Johnson does not disclose

connecting the electronic control units so they can exchange data. Johnson discloses only that a skilled artisan would appreciate that multiple controller units may be used Col. 4 lines 64-65.

Johnson does not disclose a FADEC having two channels each connected to both electronic control units in order to receive the position data from each of the doors. Johnson discloses only that the control unit receives command signals from a FADEC. Col. 4 lines 48-52.

Johnson does not disclose the two channels in the FADEC being connected to each other so as to exchange door position data and electronic unit state data. Fig. 4 only shows two arrows connected to the FADEC 53. Fig. 4 does not show the interconnectedness of the two channels of the FADEC.

To establish a prima facie case of obviousness, the Examiner must cite references that teach or suggest all the claim limitations. MPEP § 2142. The combination of Baudu and Johnson et al fail to teach or suggest that the electronic control units be connected to each other to exchange position data, and this combination of references fail to teach or suggest that the two FADEC channels be connected to each other as to exchange door position data and electronic unit state data. The combination of Baudu and Johnson fails to teach or suggest that the electronic control units be connected to each other in order to exchange position data, that each of the two channels of the FADEC be connected to each of the electronic control units in order to receive the position data from each of the door with data concerning the operating state of each electronic unit, and this combination o]f references fail to teach or suggest that the two FADEC channels be connected to each other as to exchange door position data and electronic unit state data.

The examiner states that the use of more than one electronic control unit involves the basic step that one skilled in the art would have made so as to provide redundancy to the

system if one of the electronic control units fails. The examiner did not cite any document for this allegation. The advance in the art is not the redundancy. An abundance of sensors has the effect of increasing the risk of there being a sensor breakdown. Specification page 2, lines 2-4. This abundance of sensors is also harmful because it increases the overall weight of the thrust reverser. The present invention seeks to mitigate such drawbacks by proposing a thrust reverser which provides continuous information about the position of the doors by exchanging data at the electronic control unit and FADEC levels. This provides redundancy in the event of a breakdown, thereby increasing airplane safety, but without the problems associated with the multiple sensor redundancy in the prior art.

Based on the above discussion, it is respectfully submitted that independent Claim 1 is patentably distinguished over the applied references, and dependent Claims 2-5 are therefore also patentably distinguished over the applied references.

In the outstanding Office Action, the Abstract was objected to, and the information disclosure statement received on 3/1/04 was objected to.

Applicants have amended the Abstract to comply with the requirements of MPEP § 608.01(b).

Applicants assert that the information disclosure statement received on 3/1/04 complied with 37 CFR 1.98(a)(1). The information disclosure statement is being resubmitted, along with a copy of the filing receipt dated 3/1/04 which shows that an IDS/Related/Related Cases was submitted, and that two cited pending applications were submitted.

Applicants respectfully request that the Information Disclosure Statement submitted on 10/6/03 be included in the file wrapper with the required initials indicating that the disclosed references have been reviewed.

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.

Gregory J. Maier
Attorney of Record
Registration No. 25,599

Robert T. Pous
Registration No.29,099

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 06/04)

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